

WATER LAW AND NATIONAL FOREST MANAGEMENT



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WATER LAW
and
NATIONAL FOREST MANAGEMENT

Prepared by: R. Scott Fifer, Forest Hydrologist
U.S. Forest Service, R-2
White River National Forest
Glenwood Springs, Colorado
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U.S. Forest Service
White River National Forest
P.O. Box 948
Glenwood Springs, Colorado 81601

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PREFACE

As a Forest Hydrologist, I frequently encounter questions concerning water resource legislation and its influence of National Forest management decisions. The questions generally focus on Forest Service reserved water rights and recent water quality legislation. Typical of these questions are: what exactly are reserved rights and how do they relate to state acquired water rights; what bearing does a state acquired water right have on the issuance of a special use permit; and what authority does recent water quality legislation give state and local governments over the control of management activities on National Forest land? I have found an extreme interest in water law among National Forest managers.

This report provides a primer on water law pertinent to National Forest management. It is designed to answer many of the fundamental questions I commonly encounter in the field. It provides the reader with an understanding of the major water laws that will influence Forest Service management decisions in the years ahead. The report also examines the conflicts that have evolved between the development and the conservation of our limited water supplies. The problems and opportunities of complying with the laws are reviewed and management strategies presented.

Due to the enormous complexity of this subject, some of the material introduced is discussed only briefly. Where this has occurred, I have attempted to refer the reader to supplemental material available on the subject. In addition, although much of the material is applicable to all National Forest regions, emphasis has been placed on the management situations found in the semi-arid western states.

INTRODUCTION

With the passage of the Organic Act of 1897, Congress created one of the first laws that directly influenced the administrations of the National Forest water resources. It established that one of the purposes for creating a forest resource was to "secure favorable conditions of water flows". Subsequent to this act, there have been numerous pieces of legislation and executive orders further defining Forest watershed management responsibilities. In response to these laws administrative guidelines have evolved and are provided in the Forest Service Manual. These guidelines bridge the gap between water law requirements and forest administration.

During the last decade, there has been much attention focused on forest management activities and their associated impacts on the water resources. An ever increasing population is placing additional demands on the quantity and quality of water originating from National Forest lands. With this new environmental awareness, additional laws and water resource standards have been created, further increasing the National Forests' watershed management responsibility.

Recently, there have been some significant developments in the water law field which could substantially affect the way the Forest Service administers their water resources. The Federal Water Pollution Control Act Amendments, National Forest Management Act, Federal Land Policy Management Act and the recent Supreme Court decision involving Federal reserved water rights are but a few of the laws which will shape the present and future policies of forest management. Consequently, it is important that National Forest managers understand these laws and their impact so that they may effectively manage the forest resources. Although there are a number of

sources of information dealing with Federal water rights and water quality legislation, often several references must be reviewed to obtain an understanding of water law and National Forest Management. There is a need, therefore, to provide the National Forest manager with a single, straight-forward reference discussing the laws behind the development of present and future Forest Service water policy. This report supplements the guidance provided by the Forest Service Manual by providing the reader with an understanding of the laws that pertain to water quantity and water quality, and how they influence his present and future land management decisions.

WATER QUANTITY

Although water is one of the most abundant compounds on earth, it is not uniformly distributed over the land surface and can often be elusive to potential users. Its availability is largely dependent on climatic conditions. The amount, kind, and seasonal distribution of precipitation are the primary factors that determine the available water supplies in a given area.

In dryer regions such as much of the western United States, precipitation is relatively low, limiting the amount of moisture available for plant growth and streamflow. This in itself was not a problem until man's increasing demand began burdening available supplies. As more people settled in the dryer regions, additional water was needed for mining, irrigation and industrial uses. It was not long before the demand outweighed the supply, creating water shortages and initiating controversies over water ownership. There was simply not enough water to fulfill everyone's needs. It became necessary to distribute the water in a

more systematic and efficient way. Distribution of the water began by local customs tailored to meet the arid conditions. Generally, the water was allocated to those who used it first and they retained priority over subsequent water users. This was the beginning of water rights in the western states as we know them today.

Water Rights

A water right is a right to use a certain portion of water for a beneficial purpose that is considered of some economic and social value.¹ Any legal entity can obtain a water right including individuals, partnerships, companies, states and the federal government.

There has been much controversy lately concerning the complex legal issues surrounding the federal government and water right ownership. This is especially true in the arid west where the states have become alarmed over the increasing assertion of water right claims by the government on federal reserves. They are fearful that these claims will interfere with the distribution and administration of water rights that have evolved under state laws. Recent court decisions have attempted to solve this federal-state controversy. However, as we will see later, much still remains to be clarified with respect to water ownership.

Before we begin an in-depth discussion of National Forest water rights, it is important that the reader understand both the state and federal water right appropriation systems. This will provide an appreciation of both systems and illustrate the legal pathways that lead to the inevitable conflict. We will examine three major water right doctrines: riparian, appropriation and reservation.

¹A beneficial purpose might include irrigation, stock watering, domestic, mining, industrial and in some states, instream flows for aesthetic and fishery values.

Riparian Doctrine

During the early days of development in the eastern United States, many customs and common laws were brought from England, one of which was riparian water law. The riparian doctrine provides land owners that are adjacent to streams or lakes a right to use the water. Each riparian owner has an equal right with respect to other users and is entitled to the water undiminished in quality and quantity. The user must apply the water to a "reasonable use", taking into consideration the needs and uses of others along the stream. The "reasonable use" theory implies that water uses must be beneficial, that is, of some economic or social value. A new use that interferes with existing users is generally considered unreasonable. However, conflicts are usually decided by the courts on a case by case basis. A senior water user does not always have priority over junior users.

In order for the riparian doctrine to function effectively, the area must have abundant precipitation and water supplies. This minimizes diversion requirements, thereby reducing potential conflicts between users. In the United States, the riparian doctrine is prevalent in the eastern states where annual precipitation is usually well over 20 inches.

The important features of a riparian right include:

1. The water right is dependent on land ownership adjacent to a water body.
2. A water right may be used on that riparian land only, and cannot be sold for use in another location.
3. Land beyond the natural watershed boundary is not considered riparian. This effectively prohibits trans-basin diversions.
4. The water right cannot be lost by non-use.

Prior Appropriation Doctrine

As development progressed westward across the United States, the settlers encountered vastly different climatic conditions than found in the East. The relatively low amount of precipitation limited available water supplies, producing an arid environment. Streams and lakes were small and infrequent. As a result, only a small fraction of the land was actually adjacent to water bodies. Application of the riparian doctrine would have limited water use to a very small proportion of land and made the vast majority of non-riparian lands unusable. It soon became apparent the riparian doctrine was not appropriate in the western states.

The distribution and use of water in the West began by local custom. Early mining processes required substantial amounts of water. The miners diverted water from the creeks and conveyed it to their work site. Although disputes with subsequent miners over the use of water were often settled by gun, it generally became custom that those who diverted the water first, were entitled to its use over subsequent diversion. Later, farmers and ranchers adopted similar customs for irrigation practices. This concept of "first in time, first in right" evolved into what is known as the prior appropriation doctrine.

Today, this doctrine is prevalent in most of the western United States. Its use has been upheld in several legal proceedings.² The procedure to obtain an appropriation right varies from state to state. Generally, the water right is initiated by applying for a permit from the

²See *Irwin v. Phillips*, Supreme Court of California, 1855, 5 Cal. 140. and *Coffin v Left Hand Ditch Co.*, Supreme Court of Colorado, 1882, 6 Colo. 443.

State Engineer. If the Engineer determines that water is available for appropriation and that the new appropriation will not injure other users, he will issue a permit approving development of the water right. The priority of right with respect to other users depends on the date of the permit application.³

Although riparian and appropriation rights are each a property interest created by state law, their legal characteristics vary considerably. An appropriative water right is a real property right that remains the proprietor's so long as he continues to put it to a beneficial use. Failure to use the right can cause loss either by forfeiture or abandonment. Its use is not limited to land within a given watershed. Finally, the purpose of use and point of diversion can be changed to benefit the proprietor so long as it does not cause injury to other water right users. The amount of water that can be transferred is limited to the historic consumptive use of the water right.⁴

Reservation Doctrine

A reserved water right is one that is owned by the Federal Government. It is separate from and not dependent upon water rights generated by state laws. The United States Supreme Court recently summarized the reservation doctrine in *Cappaert v. United States*.⁵

³Colorado water rights are appropriated by applying a certain portion of water to a beneficial use. To protect the water right, one must file in water court. If the court determines that water is available for appropriation and other users will not be harmed, it awards a water right decree (adjudication). The priority of the right depends on the date of appropriation.

⁴For a complete discussion on Colorado Water law, see *Evolution and Administration of Colorado Water Law*: by Radosevich, Nobe, Allardice and Kirkwood. See also, *Water Law* by Joseph Sax.

⁵96 S. Ct. 2062 (June 7, 1976).

" . . . when the Federal Government withdraws its lands from the public domain and reserves it for a federal purpose, the Government, by implication, reserves appurtenant water then unappropriated to the extent needed to accomplish the purpose of the reservation. In doing so the United States acquires a reserved water right in unappropriated water which vests on the date of the reservation and is superior to the rights of future appropriators. The doctrine applies to Indian reservations and other federal enclaves, encompassing water rights in navigable and non-navigable streams."

The federal authority to own water rights originates from the commerce clause, the supremacy clause and the property clause of the United States Constitution. The commerce clause provides that Congress may supercede both state law and state generated private rights for the regulation of navigable streams.⁶ The property clause authorizes Congress to regulate federal lands. This includes using a share of navigable and non-navigable waters arising on federal land. The supremacy clause establishes the federal government as a sovereign (superior) land owner and consequently is entitled to have its water needs fulfilled before others.⁷

History of Reserved Rights

Because reserved water rights were created by implication rather than explicit Congressional legislation, the courts have had to define the "reserved right" in a number of legal proceedings. In *Winters v. United States*, the United States Supreme Court held that the federal government, in establishing an Indian reservation, impliedly reserved water sufficient "to help civilize a nomadic people".⁸ The significance of this case was that it established that federal reserved water rights were created at

⁶Study of Development, Management and Use of the Water Resources on Public Lands, page 5-6.

⁷No Water for the Woods: A Critical Analysis of *United States v. New Mexico*, p. 512.

⁸207 U.S. 564 (1908).

the time of the land reservation. When the water is eventually put to use, the rights of the United States will be superior to any state water rights created after the reservation even if the federal reserved rights were not yet perfected. The majority opinion of the court said:

"The power of the Government to reserve the waters and exempt them from appropriation under the State laws is not denied, and could not be . . . That the Government did reserve them we have decided, and for a use which would be necessarily continued through years."

In the 1955 Federal Power Commission v. Oregon case, the reservation doctrine was expanded to include non-Indian reserved lands.⁹ The State of Oregon sought to prevent the Federal Power Commission from granting a license to a power company to build a dam across the Deschutes River. The dam was located on federal reserved land. The State argued that the dam would be detrimental to the fishery resource. Relying on the property clause of the Constitution, the Court held the Federal Power Commission could issue the license without State approval. The majority opinion of the Court said:

"There thus remains no question as to the constitutional and statutory authority of the Federal Power Commission to grant a valid license for a power project on reserved lands of the United States, provided that, as required by the Act, the use of the water does not conflict with vested rights of others. To allow Oregon to veto such use, by requiring the States' additional permission, would result in the very duplication of regulatory control."

Perhaps one of the most important cases on the reservation doctrine was Arizona v. California.¹⁰ The Supreme Court ruled that the water right principles established in Winters v. United States concerning Indian

⁹349 U.S. 435 (1955).

¹⁰373 U.S. 546 (1963).

reservations also applied to non-Indian federal reservations, including National Forests, National Recreation Areas and wildlife refuges. The Court found that at the time of the reservation, the United States intended to reserve waters for future reasonable needs in sufficient quantity to fulfill the purposes of the reservation. The majority opinion of the Court said:

"The Master ruled that the principle underlying the reservation of water rights for Indian reservations was equally applicable to other Federal establishments, such as National Recreation Areas and National Forests. We agree with the conclusions of the Master that the United States intended to reserve water sufficient for the future requirements . . ."

In a recent case, *Cappaert v. United States*, the Supreme Court ruled that the reservation doctrine also applied to land established as a National Monument.¹¹ The ruling protected the water level of a pool formed in a deep limestone cavern at the Devils Hole National Monument. The water level of the pool was being lowered by pumping from irrigation wells on the adjacent Cappaert ranch. The lower water levels were threatening the inhabitants of the pool, the endangered desert fish (pupfish). This case is significant in that the reservation doctrine was extended to groundwater as well as surface water.

Federal-State Water Conflicts

In the previous sections, we have briefly examined the major doctrines governing water right appropriations. We have seen the development of two parallel yet antagonistic water right systems developing in the western states. On one hand, water right distribution is controlled by state laws. It is a system that has evolved by necessity

¹¹Supreme Court of the United States, 1976, 426 U.S. 128, 96 S. Ct. 2062, 48 L. Ed. 2d 523.

to define individuals rights against each other and to resolve disputes between them. On the other hand, the Federal Government owns and controls water rights on reserved lands which are not dependent upon state laws or procedures. Often, the federal rights are not quantified, leaving an air of uncertainty for water users under the state systems. Some argue this has hampered the development of an efficient, dependable water appropriation system.

The states argue that they have the sole authority to use and distribute the water within their boundaries. They base their arguments on the "silent acquiescence" by the federal government for not prohibiting the early miners from diverting water from the public streams. They also argue that early federal statutes directed the settlers on federal lands to comply with local water rights customs, thereby relinquishing any claim to the waters.

Beginning in 1866, Congress passed the first of three statutes that provide the basis for state regulatory authority over water rights. The Mining Act of 1866 protected the rights of the miners by establishing "whenever by priority of possession, rights to the use of water for mining, agriculture, manufacturing, or other purposes, have vested and accrued and the same are recognized and acknowledged by the local customs, laws and the decisions of courts, the possessors and owners of such vested rights shall be maintained and protected in the same."¹² This law recognized the miners claims to water rights in the streams of public lands.

In 1870, Congress reinforced the 1866 Act by providing that federal patents and homesteads "shall be subject to any vested and accrued water rights, or rights to ditches and reservoirs used in connection with such

¹²Act of July 26, 1866, ch. 262, 14 Stat. 251 (1866).

water rights, as may have been acquired."¹³ The third statute, the Desert Land Act of 1877, was the strongest enunciation of the appropriation doctrine yet.¹⁴ Congress provided that the homesteaders have rights to the use of water "necessarily used for the purpose of irrigation and reclamation" and went on to state: "all the surplus water over and above such actual appropriation and use together with the water of all lakes, rivers, and other sources of supply upon the public lands and not navigable, shall remain and be held free for the appropriation and use of the public for irrigation, mining and manufacturing purposes subject to existing rights."

The states argue that these three statutes effectively waived the United States claim to water rights on the public domain. They maintain that the laws provided for all water rights to be appropriated under state water laws.

In contrast, the federal government argues that the statutes did not divest it of its authority to use unappropriated waters on the public lands for Governmental purposes. This argument has been supported by the United States Supreme Court. In *Cappaert v. United States*, the Court rejected Cappaerts argument that the federal government must perfect its water rights according to state laws as outlined in the Desert Land Act of 1877. The Court ruled that the Desert Land Act's severance of the water from the public lands did not apply to lands reserved from the public domain. Again in the *United States v. New Mexico*, the Court concluded that "whatever power the States acquired over their waters as a result of congressional acts and admission to the Union, however, Congress did not

¹³Act of July 9, 1870, ch. 235, 16 Stat. 217 (1879).

¹⁴Desert Land Act, ch. 197, 19 Stat. 377 (1877).

intend thereby to relinquish its authority to reserve unappropriated water in the future for use on appurtenant lands withdrawn from the public domain for special federal purposes.¹⁵

It is important to recognize the distinction between lands withdrawn (or reserved) from the public domain, such as a National Forest and those lands of the public domain which were later settled through homesteading. The Courts are recognizing the reservation doctrine on withdrawn lands and not those that remained in the public domain.

National Forest Water Rights

Reservation Doctrine

In 1891, Congress authorized the President to create National Forests by withdrawing (reserving) them from the public domain.¹⁶ As established in the previous chapters, Congress also impliedly reserved water in sufficient quantities to fulfill the purposes for which the National Forests were established. The purposes of the National Forests were outlined in the Organic Administration Act of 1897 in which Congress declared:

"No national forest shall be established, except to improve and protect the forest within the boundaries or for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States."¹⁷

Later, in the Multiple Use Sustained Yield Act of 1960, Congress supplemented its statement of purpose contained in the 1897 Act by establishing that "it is the policy of Congress that the National

¹⁵438 U.S. 696, 700 (1978).

¹⁶Creative Act of 1891, ch. 561, 26 Stat. 1103.

¹⁷Act of June 4, 1897, ch. 2, 30 Stat. 34.

Forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purpose."¹⁸

Consistent with these purposes, the Forest Service has always maintained that it is entitled to water in sufficient quantity to fulfill the present and future demands of all those purposes for the development and management of resources of the National Forest System. The purposes include timber production, stock watering, wildlife management, fire fighting, irrigation, administrative site uses and watershed management. In addition, the Forest Service claimed sufficient water such that minimum stream and lake levels were adequate to insure the continued nutrition, growth, conservation and reproduction of fish and to preserve the recreational, scenic and aesthetic conditions of the riparian corridors.¹⁹ The United States claimed a priority date for the uses of water on each of the National Forests as the date the forests were reserved from the public domain.

With respect to obtaining the water rights necessary to fulfill these purposes,

"it is Forest Service policy to quantify and secure water needed for the management of the National Forests in the most efficient and effective manner consistent with applicable State and Federal laws, and with due consideration for the needs of other water users. Water, including instream flows and standing water, necessary for the development, use, and management of resources of the National Forest System, will be obtained and used in accordance with the reservation principle where applicable. . . In cases where it is applicable, the proper State water agency will be notified of current and foreseeable future water requirements and such Federal rights will be determined and adjudicated in

¹⁸Act of June 12, 1960, 74 Stat. 215, 16 U.S.C. 528 (1964).

¹⁹Master Referee's Final Report, Case-in-Chief-Claims of the United States covering water rights within the State of Colorado - Water Divisions 4, 5, and 6.

appropriate proceedings."²⁰

United States v. New Mexico

The Forest Service continued to operate under the policy that it was entitled to water rights, including instream flows, that were necessary to fulfill the purposes outlined in the Organic Act and Multiple Use Sustained Yield Act. The water rights enjoyed a relatively early priority because most Forests were reserved in the late 1800's and early 1900's. However, in 1978, the United States Supreme Court critically examined the purposes for which the National Forests were reserved and addressed the issue of what quantity of water, if any, the United States actually reserved at the time the forests were withdrawn. In a landmark decision, the Court, by a vote of 5 to 4, limited the purposes for which National Forests were established and in so doing, apparently limited National Forest reserved water rights.

In 1970, the State of New Mexico began a general adjudication procedure to identify all water rights on the Rio Mimbres River. The Gila National Forest which is located in the headwaters of the Rio Mimbres River, responded by claiming reserved water rights necessary for stock watering, recreation, aesthetics and wildlife preservation, including instream flows. The District Court, New Mexico Supreme Court and United States Supreme Court all rejected the United States reserved rights argument and held

"The United States, in setting the Gila National Forest aside from the public lands, held to have reserved the use of water out of the Rio Mimbres only where necessary to preserve the timber in the forest or to secure favorable water flows, and hence not to have a reserved right to aesthetic, recreational, wildlife preservation, and stockwatering purposes."

In essence, the Court limited the purposes of forest reserves to those

²⁰Forest Service Manual 2541.03.

outlined in the Organic Act of 1897 and rejected the uses established in the Multiple Use Sustained Yield Act as being true purposes of establishing the National Forests. The Court held that the Multiple Use Sustained Yield Act only broadened the benefits accruing from National Forests by identifying "secondary purposes". They also said Congress was aware of the various uses being made of the forests, including grazing and recreation, but that these were not the purposes for establishing National Forests.

At first glance it would appear the National Forests suffered a severe setback in obtaining water rights necessary to manage the lands. However, many questions remain to be answered before the full impact of the New Mexico decision can be assessed. For instance, the Court did establish that the Forest Service has title to water rights necessary for the maintenance of favorable conditions of water flows. What are favorable conditions of water flows and how much water is needed to satisfy this condition? We will pursue this question in the following chapter, however, the ultimate answer will undoubtedly have to be defined by the Courts in future legal proceedings. Also unanswered by the New Mexico decision is whether the United States is entitled to reserved water rights for recreation, aesthetics, stock water and wildlife from the date they were authorized by the Multiple Use Sustained Yield Act of 1960. Although a water right date of 1960 would probably have a low priority against other water users, it is better than no right at all. This issue is being addressed by the courts in an on-going case in Colorado and will probably be answered by the United States Supreme Court within the next couple of years.²¹

The New Mexico decision did confirm that the Forest Service has some reserved water rights originating from the 1897 Organic Act. The Forest

²¹Case-in-Chief-Claims of the United States covering water rights within the State of Colorado - Water Divisions 4, 5 and 6.

Service has recently defined the types of water uses that will be claimed under the reservation doctrine as reserved water rights appurtenant to the Organic Act.²² They include:

- a. Domestic water needed at Ranger Stations, Fire Stations, work centers, housing, and other facilities constructed and maintained for administering the National Forest System that include programs of watershed protection and timber production.
- b. Water needed in connection with fire protection and control.
- c. Water needed in connection with the construction and maintenance of roads used as access for activities such as timber harvesting, timber stand improvement, fire prevention and control, watershed rehabilitation, and reforestation.
- d. Water needed for irrigation of tree nurseries, seed orchards, and other facilities devoted primarily to the support of a continuous supply of timber, or to watershed protection.
- e. Water needed to maintain Forest Service riding and pack stock, including the irrigation of pastures, used in the administration of the National Forest System for the purposes recognized above.
- f. Water needed in connection with special uses where the permittee is engaged in activities carried out for watershed protection or timber production on National Forest System lands. This includes water for logging camps, insect and disease control work centers, work centers set up to carry out flood prevention and control programs, etc.

It is also current Forest Service direction that reserved rights may be claimed for other purposes where authorized by specific legislation or in a particular reserving document. Examples would be streamflow claims for rivers recognized by the Wild and Scenic Rivers Act²³ or fishery flows in connection with the Multiple-Use Sustained-Yield Act. The priority date of these claims would be the date of the establishment of authority, 1968 and 1960, respectively.

²²Forest Service Progress Report in Responding to the President's Directive Relative to Federal Reserved Rights, 1979.

²³82 Stat. 917: 16 U.S.C. 1271 (1968).

Appropriation Doctrine

In addition to reserved water rights, the Forest Service owns many appropriative water rights on lands that have been acquired by purchase or trade.²⁴ Because these lands were not withdrawn from the public domain, the Forest Service must perfect its water rights like any other water right user in accordance with the appropriate state laws. Forest Service policy states:

"Where the reservation principle is not applicable, water rights will be obtained in accordance with State laws. The Forest Service, in all matters related to water use and water rights, will endeavor to work cooperatively with the States. Such cooperation will recognize the State's authority and responsibilities for allocation of waters within the States and the need for the State to be informed as to uses and future needs of water on the National Forests."

It is important that the forest manager distinguish between the two types of Forest Service water rights. Unlike the reserved water right which remains valid even if not yet perfected, the appropriative water right can be lost by non-use either through abandonment or forfeiture, depending upon the state law.

Abandonment occurs when a party does not exercise its water right and does not intend to use it in the future. Prolonged periods of non-use provide a legal argument that there was an intent to abandon the right.²⁵ In contrast, forfeiture occurs when a water right is not used for a certain period of time which has been established by state

²⁴Acquisition of private lands is authorized by the Weeks Act of March 1, 1911, ch. 186, 36 Stat. 962.

²⁵In Colorado, non-use of a water right for 10 years or more constitutes a legal argument for abandonment.

statute.²⁶ It differs from abandonment in that an intent not to use the right does not have to be shown.

By what ever means a water right is lost, it can represent a tremendous monetary loss to the Federal Government. A recent water right appraisal on acquired land within the White River National Forest in Colorado, determined the fair market value of water rights used to irrigate 133 acres of pasture land to be worth \$60,600.²⁷ Other water rights acquired on the same Forest, although not appraised, have been estimated to be worth in the hundreds of thousands of dollars.²⁸ Consequently, it behooves the forest manager to be familiar with the appropriate state water laws so he can continue to diligently perfect any acquired appropriative water rights.

Streamflows and Management Strategies

Regardless of what the courts may ultimately establish as National Forest water rights, those of us connected with forest management recognize the necessity to maintain certain streamflow and lake levels to fulfill our responsibility for the administration and protection of the forest resources. This opinion is clearly shared by Congress and is expressed in several laws and Executive Orders directing Federal agencies to protect and

²⁶In New Mexico, a water right is forfeited if it is not used for a period of 4 years.

²⁷Fifer and Helton, 1979. Water Right Appraisal, Hunter Creek.

²⁸Fifer, 1979, Meadow Mountain Purchase, Water Resources.

preserve the aquatic and riparian habitats.²⁹ These laws provide the forest manager with the authority to secure favorable streamflow conditions where necessary to protect the aquatic resources. At the same time, the Forest Service recognizes the rights of individuals who have over the years become dependent on water arising on National Forest land. When determining required instream flow needs or minimum lake levels, the Forest Service has adopted a policy of "reasonable use". This policy is expressed in Forest Service Manual 2541.03.

"Water required for National Forest System purpose will be used efficiently in water-scarce areas, it will be used frugally. Forest Service responsibility for meeting the resource needs of the people, including water, dictates a policy of caution and reasonableness in its deliberate use of water to improve the use and productivity of the National Forest System. In determining such needs in areas of short supply, careful consideration will be given to the needs of non-National Forest users who are dependent on water for their livelihood. This will require a Forest Service analysis of the importance of water, including instream flows, for both National Forest System and non-National Forest System purposes."

It is in this spirit that the following management strategies to secure instream flows are presented.

Water Rights - Reserved Land

As we have discovered, the Supreme Court, in *United States v. New Mexico*, held that the Forest Service does have reserved water rights where necessary to secure favorable conditions of water flows, but exactly what

²⁹The importance of watershed protection was first recognized by the Organic Act of 1897 and reaffirmed by subsequent legislation including Weeks Act of 1911 (16 U.S.C. 480, 500, 513-19, 521, 552, 536), Clarke-McNary Act of 1924 (43 Stat. 653), Fish and Wildlife Coordination Act of 1934 (16 U.S.C. 661-64), Watershed Protection and Flood Prevention Act of 1954 (P.L. 566, 68 Stat. 666, 16 U.S.C. 1001), and the Federal Water Pollution Control Act Amendment of 1972 (P.L. 92-500) as amended by the Clean Water Act of 1977 (P.L. 95-217). For a good summary see Forest Service Manual 2500 and the Principle Laws Relating to Forest Service Activities, Agricultural Handbook No. 453, U.S.D.A. Forest Service.

are favorable conditions of water flows? How much water is it and when does it occur? These questions have perplexed attorneys and hydrologists alike since the New Mexico decision. Whatever the Forest Service claims as favorable flow conditions, will undoubtedly be challenged by junior water users and will ultimately have to be defined by the courts.

Although the Forest Service has not yet defined its interpretation of "favorable conditions of water flows", there are some interesting theories developing within the agency. The theories are basically in accord with what Justice Powell, one of the four dissenting Justices in the New Mexico decision said:

"I do not agree, however, that the forests which Congress intended to 'improve and protect' are still silent, lifeless places envisioned by the Court. In my view, the forests consist of the birds, animals, and fish - the wildlife - that inhabit them, as well as the trees, flowers, shrubs, and grasses. I therefore would hold that the United States is entitled to so much water as necessary to sustain the wildlife of the forests, as well as the plants."

Justice Powell has recognized that a forest is not just limited to a stand of trees, but rather is an interaction of vegetation, soils, water and living organisms. It is a diverse, living community influenced by many physical and biological processes that have established an ecological balance over many years.

This concept of balance was evident when Congress created the National Forests to provide for timber production and favorable streamflows. Each resource is dependent upon the other and each must be sustained in an ecological balance to prevent the degradation of the other.

It is well documented that extensive removal of forest vegetation due either to fire or timber harvest can have significant adverse effects

on the water resources.³⁰ The resultant degradation of the water quality, including increased sediment loads and organic debris can render the water useless for many purposes. This creates an unfavorable streamflow condition for forest and downstream non-forest uses alike.

Just as extensive vegetative removal can impair favorable streamflows, significant alterations to the streamflow regime can adversely effect the timber resource. Floods have the most obvious effect. If enough water is added to a stream system, such as from natural storm events, reservoir releases, or trans-basin diversion, so that the flow exceeds the channel capacity, waterway damage may occur. Extensive flooding will damage the stream channel, riparian vegetation and adjacent timber resources. Similarly, a large drop in the established streamflow, such as caused by stream diversions, can lead to sediment and debris accumulations resulting in impairment of water quality. This again produces unfavorable streamflow conditions by precluding beneficial use of the water, both on and below the National Forest. As a result, the Forest Service tries to manage the water resource somewhere between these two extremes.

The level to which a stream may be dewatered without significantly upsetting the established ecological balance is a very difficult technical question. I believe that favorable streamflows include that quantity of water above which the streams energy (ability to transport its sediment load) is not impaired to a point that its sediment load is deposited in sufficient quantity to produce an unexpected change in the fluvial land form. What this simply means is that there is a point when a reduction in streamflow volume and velocity prohibits the water from picking up and transporting sediment. When this happens, the equilibrium balance that has

³⁰Fredricksen (1970) and Brown and Krygier (1971).

developed between streamflow and sediment load is upset. The stream will attempt to adjust to the new load by changing its gradient or channel form. This can result in channel scour of the bed and banks.

If the adjustment causes a condition such that increased channel scour and/or deposition injuriously affects National Forest and downstream property then a favorable condition of streamflow does not exist. The level of flow in which this occurs will vary from stream to stream and must be identified on a case by case basis.

Water Rights - Acquired Lands

The Act of September 21, 1944 authorizes the Forest Service to purchase water rights necessary for the administration and public use of the National Forests.³¹ As we discussed earlier, the water rights may be obtained as part of a land purchase or acquired separately, but in either case, they must be secured and maintained in accordance with applicable state laws.

Some of the western states recognize instream flows as a beneficial use and allow water to be appropriated for that purpose.³² Water rights acquired by the Forest Service may be able to be transferred from existing uses, such as irrigation or domestic rights, to instream flow purposes. However, the amount that can be transferred can be no greater than what was historically used by the water right. Buying a 10 cubic foot per second (cfs) water right for instream flow purposes does not guarantee that 10 cfs can be maintained in the stream. The amount depends on how much water has historically been available for diversion, the water right's priority with respect to other users, and how diligently the water right has been

³¹Act of September 21, 1944 (58 Stat. 737, 16 U.S.C. 526) commonly called the Department of Agriculture Organic Act.

³²Oregon, California, Colorado, Idaho, Oklahoma, Washington and Montana.

exercised by past owners. A hydrologic analysis should be undertaken prior to purchasing any water right to determine the exact amount available for transfer to the stream.

In some states, such as Colorado, only the State (Colorado Water Conservation Board) is authorized to appropriate water for instream flow purposes. In this case, it may be necessary to enter into an agreement by lease or memorandum of understanding whereby the State "borrows" the water from the Forest Service and uses it for instream flow purposes. This type of arrangement is currently being negotiated by the White River National Forest in Colorado.

Rights-of-Way

Title V. of the Federal Land Policy and Management Act of 1976 authorizes the Secretary of Agriculture, with respect to lands within the National Forest System, to grant or renew rights-of-way upon such lands for reservoirs, canals, ditches, flumes, laterals, pipes, pipelines, tunnels, and other facilities for the impoundment or distribution of water.³³ Section 505 of the Act goes on to say that each right-of-way shall contain terms and conditions which will minimize damage to scenic and aesthetic values and fish and wildlife habitat and otherwise protect the environment.

This law establishes that any potential water user on the National Forest, or current water user whose right-of-way is subject to renewal, must comply with stipulations including instream flow requirements necessary to protect the environment. This would include all special use permits, easements and right-of-way applications on National Forest land.

Water rights obtained under state law have no bearing in determining whether to allow a proposed water project or not. The Forest Service

³³(43 U.S.C. 1701).

Manual states:

" . . . any establishment under State law of rights to the use of water on lands on the National Forest System by a permittee should not be construed as limiting the Regional Forester's authority to regulate land use and occupancy or to prevent injury to property of the United States."³⁴

Wild and Scenic River Act of 1968

The value of maintaining a healthy, free flowing stream environment was legislatively recognized by Congress with the passage of the Wild and Scenic Rivers Act of 1968. The Act establishes as national policy that "selected rivers, or sections thereof, should be preserved in a free flowing condition and that they and their immediate environment shall be protected for the benefit and enjoyment of present and future generations".³⁵ The act is limited in scope, however, to include only those rivers that possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or similar values.

The law directs the Secretary of Interior and Agriculture to make specific studies to determine which river should be included under the wild and scenic designation. Recommendations must be approved by the President and Congress. Once designated, the law provides for a variety of federal authority to protect and maintain the integrity of the streamflows.

This provides the opportunity for those forests with "outstanding" rivers to obtain instream flow protection. It is current Forest Service direction that waters included in a National wild, scenic or recreational river area, are claimable as reserved water under established principles of law to the extent necessary to carry out the purposes of the Act. Claims made under this authority would seek a water right priority date of

³⁴Forest Service Manual 2541.5.

³⁵82 Stat. 906 as amended; 16 U.S.C. 1271-1287.

October 2, 1968. However, such claims shall not be made without consultation with the Chief of the Forest Service and the Office of General Council.

Wetlands

Executive Order 11990 issued May 24, 1977 provide a legal basis to secure water levels and streamflows necessary to protect National Forest wetlands.³⁶ This order requires that federal agencies take action to minimize destruction, loss, or degradation of wetlands, and to preserve and enhance their natural and beneficial values. In carrying out this order, Section 5 requires each agency to consider the maintenance of the natural systems, including conservation and long term productivity of existing flora, and fauna, species and habitat diversity and stability, hydrologic utility, fish, wildlife, timber and food and fiber resources.

Current Forest Service direction provides that all proposed developments in wetland areas be carefully assessed of their potential impacts.³⁷ Action will be taken to minimize loss or degradation of wetlands including the restrictions of activities if determined necessary. This included uses on National Forest System lands authorized by lease, easement, or right-of-way.

This means, for example, that if a proposed water diversion project could adversely affect the integrity of the wetland due to the removal of water, the Forest can impose diversion restrictions. This might be an

³⁶Wetlands: as defined by Forest Service Manual 2527.05e, wetlands means those areas that are inundated by surface and ground water with a frequency sufficient to support, and under normal circumstances does or would support, a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as potholes, wet meadows, river overflows, mud flats and natural ponds.

³⁷Forest Service Manual 2520.

instream flow claim or minimum lake level requirement similar to those sought by Forest Service water right claims. Each case will have to be individually assessed by the forest hydrologist and wildlife biologist to determine potential impacts and appropriate restrictions.

WATER QUALITY

As our industrial nation grew during the early part of the century, so did the demand for water. The use and reuse of water for industrial, municipal and agricultural purposes resulted in a general deterioration of its quality.³⁸ This trend has produced an increasing concern over the condition of the nation's water resources. This is evidenced by recent ambitious federal legislation designed to restore and maintain the integrity of the nation's water. These laws are very comprehensive and demand strict compliance by the private sector, state and federal governments alike. They have effectively changed the way in which we manage the water resources in the United States.

Two laws in particular, the Federal Water Pollution Control Act Amendments of 1972 and the National Forest Management Act of 1976 have had substantial impact on the management of National Forest land.³⁹ They require careful planning and administration of all forest activities that may affect the water resource. This includes assigning protective management stipulations and prohibiting those management practices that will cause detrimental changes in water quality. Together, these laws have tremendously increased the Forest Service's responsibility for

³⁸Water quality is a term that describes the physical, chemical and biological characteristics of water with respect to its suitability for a particular use.

³⁹P.L. 92-500, 86 Stat. 816 (1972), and Act of October 22, 1976 (16 U.S.C. 1600).

administration and protection of the water resource. In the future as these laws are fully implemented, the forest manager can expect to spend more of his time and energies on water resource management.

Even before these laws were passed, the protection and administration of the water resources has been an integral part of National Forest management. It has long been Forest Service policy that forest management activities will be conducted in a way to protect or enhance the soil and water resources.⁴⁰ Implementing sound watershed management is directed by numerous acts of Congress.⁴¹

The basic authority for watershed management on National Forest lands extends from the Organic Act of 1897. As we discussed in previous chapters, the law established that one of the purposes of the National Forests was to secure favorable conditions of waterflows. Maintaining good water quality is essential to securing favorable conditions of flow.

In the Weeks Act of 1911 Congress recognized it was beneficial to purchase and restore non-Forest Service land that was in poor condition.⁴² It directed the Secretary of Agriculture to recommend for purchase such forested, cutover, or denuded lands within the watersheds of navigable streams as may be necessary to regulate their flow.

The Federal Water Pollution Control Act of 1956 was the first permanent federal law to address water quality on a national basis. Its purpose was to enhance the quality and value of the water resource, and to establish a national policy, the prevention, control, and abatement of water pollution. It established a national network for water quality surveillance and directed Federal agencies to control pollution from

⁴⁰Forest Service Manual 2503.

⁴¹See Forest Service Manual 2500 for a complete listing of laws.

⁴²Weeks Act of March 1, 1911 as amended (16 U.S.C. 480 500).

Federal facilities. This included National Forest land.

In 1960, the Multiple Use Sustained Yield Act established that National Forests shall be administered for outdoor recreation, range, timber, watershed, wildlife, and fish purposes.⁴³ This directed the Forest Service to manage for a multiple of uses while protecting the values of each individual resource.

The Water Quality Act of 1965 strengthened the 1956 Federal Water Pollution Control Act by requiring the states to develop an effective pollution abatement program based on stream standards.⁴⁴ It also provided Federal cooperation with state agencies to control pollution of water over which the States have jurisdiction. In 1970, this was expanded to include Federal compliance with State established water quality standards.⁴⁵

Despite these numerous water resource laws, pollution problems prevailed in many parts of the country. There was still not an effective nation-wide water quality control program. As a result, within the last decade, Congress has passed the most comprehensive water quality legislation to date. It is directed at controlling all types of pollution whether from industrial, municipal, agricultural or silvicultural sources.

The new laws were not passed because of repeated flagrant water quality violations on National Forest land, but rather because of inconsistencies in the various State programs to provide a unified national water quality control effort. Congress did recognize, however, that to provide for an effective national program, they must protect water quality on forested land as well as the urban centers. Indeed, the forest

⁴³Multiple Use Sustained Yield Act of June 12, 1960 (16 U.S.C. 528-531).

⁴⁴Water Quality Act of 1965 (79 Stat. 903).

⁴⁵Water Quality Improvement Act of 1970 (84 Stat. 91).

environment accounts for one third of the total land in the United States and in the eleven western states more than half of the streamflow originates from National Forest lands.⁴⁶

Forest Management Activities and Water Quality

In general, the streams and lakes within the National Forest System are characterized by excellent water quality. The forest's vegetative cover protects the surface soil from the erosive force of rain. What water that does reach the ground quickly infiltrates into the forest soils, leaving little available for overland flow. However, when this natural system is disturbed either from natural sources or man's activities, pollution can occur. Forest management practices that may affect these natural characteristics include logging, grazing, road construction and fire management. Any one of these activities can increase the suspended sediment, organic matter, and surface water temperature of forest stream if not properly managed.

Stream sedimentation results from the detachment of soil particles and their transport to the stream system, usually by fluvial processes. Detachment occurs from raindrop impact on unprotected mineral soil. The amount of sedimentation that will occur depends on the vegetative cover, erodability of the soil, steepness and length of slope and climatic conditions.

Sedimentation from logging activities usually occurs with road construction, tractor logging and yarding of the logs. These activities expose the mineral soil and compact the soil surface, providing increased surface runoff and erosion.

Roads are a major source of sediment from the forest environment.

⁴⁶Forest Service Manual 2500.

Their compacted surface reduces infiltration, causing an increase in the volume and velocity of surface runoff. The increased velocities are capable of detaching and carrying more sediment to the stream system. Increased sediment yields associated with road construction activities have been documented in several studies.⁴⁷

Logging activities can also increase nutrient concentrations in forest streams. The dead trees no longer have the capacity to "take up" and store nitrates produced by the decomposition of organic matter. The released nutrients are highly mobile and leach through the soil system into the aquatic environment. Increased nutrients can result in undesirable algae blooms, which in turn will ultimately affect the oxygen supplies available for the fishery resource. Direct loading of organic debris into the stream system will also affect the oxygen content in the stream. The organisms that must decompose the material can require substantial amounts of oxygen, further limiting the supplies available for fish production.

Logging activities that result in the removal of streamside vegetation will increase stream temperatures. Removal of the vegetative canopy permits increased solar radiation which can raise the water temperature to a point that is undesirable for fish. Increased temperatures reduce the water's ability to hold oxygen and can cause stress to the aquatic organisms.

Wildfire and controlled fires, such as for slash disposal and wildlife habitat improvement, alter both the vegetative cover and soil infiltration rates. Their effects on erosion and stream sedimentation depend largely on the intensity of the fire. Hot, intense fires destroy the protective litter and duff materials on the forest floor exposing the soil to raindrop impact. In addition, the soils can become hydrophobic, a condition making

⁴⁷Brown and Krygier (1971) and Dyrness (1967).

them non-wettable and reducing their infiltration capacity. Fires of moderate or light intensities that do not consume all the organic matter cause little accelerated soil erosion.

Grazing on Forest lands can produce a similar affect on vegetative cover and soil infiltration. Cattle and sheep must be distributed to prevent erosion from overgrazing and structural damage to the soil from their hooves.

Water Pollution Control Act Amendments of 1972, as Amended 1977

On October 18, 1972, Congress enacted the Federal Water Pollution Control Act Amendments (later amended by the Clean Water Act of 1977) with the express purpose of restoring and maintaining the chemical, biological and physical integrity of the nation's waters. The Act is considered one of the most comprehensive and complex pieces of legislation ever passed. It calls for the elimination of the discharge of pollutants into the nation's water by 1985 and in the interim, wherever possible, to produce water in sufficient quality to support swimming and protect the fishery resource.

The law directs the Environmental Protection Agency (EPA) to formulate, in cooperation with other federal agencies, state and local governments, a comprehensive water quality program to control and abate pollution. To help achieve this, each state must provide water quality standards for streams and lakes, effluent limitations for point source discharges, and strict enforcement of the law through permit requirements

for each discharger.⁴⁸ Congress provided substantial federal funding to help the states develop their programs.

Section 208 of the Act provides for area-wide water quality planning of point source and non-point source pollution.⁴⁹ The plan is to be accomplished through state and local agencies working in cooperation with the EPA and other agencies such as the Forest Service. Within each planning area, one of the requirements is to identify pollution related to silvicultural activities and set forth procedures including land use requirements, to control, to the extent feasible, such sources. The law also requires the Governor of each state to designate management agencies to be responsible for carrying out the provisions of approved 208 plans. Such agencies might include county governments, municipalities, or larger state and federal agencies.

Section 313 of the Act directs that federal agencies, including the Forest Service, comply with all Federal, State and local requirements with respect to the control and abatement of water pollution in the same manner and to the same extent as any non-governmental entity. In essence this says that Forest Service management activities must comply with the goals, standards, and land use requirements established in the 208 Plan. The implications on National Forest management are obvious. As a result, the Forest Service has played an active role in the development and

⁴⁸Point Source: "Any discernable, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, or container from which pollutants are or may be discharged." This includes those sources usually associated with industrial and municipal uses.

⁴⁹Non-Point Source: pollutants arriving from an area-wide, non-discernable source. Usually are diffuse in nature and result from naturally occurring events such as precipitation, seepage, runoff, etc. reacting with man's activities. This includes sources from agricultural and silvicultural activities.

implementation of the water quality management plans. This was due in part to legal requirements of the law, but also because the Forest Service had the expertise and experience to provide leadership in controlling pollution on National Forest land. Generally, Forest Service participation in 208 planning has been to provide advisory and technical assistance and furnish resource data; including water quality, soils, vegetation, research information and river basin studies.

Much of the pollution generated from silvicultural activities is from non-point sources. Because the pollution sources are diffuse in nature, treatment of the effluent is not practical. Water quality control must deal with the activity itself and not the results of the activity. Consequently, in the 1977 amendments to the Act, Congress exempted normal forestry activities from having to obtain a point source discharge permit. Instead, water quality control would be implemented by "best management practices" (BMP). A BMP is defined as "the mix of activities and controls which together accomplish the management objectives for the land unit, while protecting downstream water quality".⁵⁰

Generally, the BMP approach has been accepted by the EPA as the method to control pollution from Forest Service land. This necessitates that forest activities be carried out with prudent management techniques including the implementing of protective controls where necessary. The difficulty of this approach is that the degree of control (BMP) must be determined on a case by case basis and will vary depending upon the scope of the activity as well as soils, climatic and vegetative factors. Some examples of BMP's relating to timber harvesting and road construction might

⁵⁰Holtje (1976).

include:

1. No tractor skidding across streams and no vehicles allowed within 25 feet of a stream.
2. Limit skidding to dry seasons or frozen soil conditions.
3. Permit no tree felling in waterways.
4. Establish buffer zones (no harvesting) adjacent streams to protect shade trees.
5. Revegetate disturbed cut and fill slopes immediately after road construction.
6. Revegetate temporary road prisms immediately after use.
7. Provide culvert drainage on all roads.
8. Monitor water quality to ensure compliance with state and local standards.

For a particular site, the appropriate mix of BMP's are selected that will maintain the integrity of the water quality consistent with all Federal, State and local requirements. BMP selection and implementation is carried out by the District Ranger. In sensitive areas, the Ranger often receives recommendations from the forest specialists, such as a hydrologist, soil scientist or wildlife biologist, to determine the appropriate BMP's.

Memorandums of Understanding between the Forest Service, State and local 208 planning agencies are made to promote cooperation and good working relations for implementing the 208 Plan. Agreements usually include provisions to periodically review the effectiveness of the Forest Service BMP program.

Section 404 of the Act establishes another permit program to be administered by the Corps of Engineers to regulate the placement of structures, excavation and/or discharge of dredged or fill material

into the waters of the United States.⁵¹ Just as with point source discharge permits, under the 1977 amendments, normal forestry activities such as logging operations are not required to obtain a Section 404 permit. However, other types of activities such as road fills, riprap placement, bridge construction, boat ramps and stream improvement structures may require a permit from the Corps of Engineers prior to construction.

Not every activity in or near the stream will require an individual permit. Certain activities and work have already been authorized by nation-wide and general permits.

Nation-wide permits have been issued by the Corps for discharges into minor waters of the United States. Minor is identified as lakes less than 10 surface acres and streams where the annual flow is less than 5 cubic feet per second. If an activity is to take place in a lake or stream of this size or smaller, no permit will be required if water quality standards are maintained. Nation-wide permits have also been issued for minor fills associated with road crossings, repair and replacement of existing fills and for limited bank stabilization or erosion control. The activities are permitted without permit if the material discharged below the ordinary high water line is limited to 200 cubic yards.

The Corps may also issue a general permit for activities similar in nature and that cause only minor individual and cumulative adverse environmental impacts. In Colorado, the Corps has issued a general permit for stream habitat improvement structures. Prior to placing a structure in the stream, the Forest Service must submit plans and drawings of the proposed work along with an evaluation of the effects on nearby wetlands.

⁵¹Waters of the United States - Coastal and inland waters, lakes, rivers, and streams that are navigable or are tributary to a navigable water, including adjacent wetlands.

A letter of endorsement is also required from the Colorado Division of Wildlife.

All other forest activities that will result in the discharge of dredged or fill material in the nation's waters, and is not already covered by a nation-wide or general permit, must obtain an individual permit from the Corps. This includes activities on the Forest by individuals operating under a special use permit or an easement. A permit application to the Corps requires a detailed description of the proposed activity, including the purpose, use, type of structures, facilities for handling wastes, and the type, composition and quantity of dredged or fill material.

National Forest Management Act of 1976

If the 1972 Federal Water Pollution Control Act left any doubts about water quality management responsibility on National Forest lands, they were clarified with the passage of the National Forest Management Act of 1976 (NFMA). NFMA is an amendment to the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA). It provides comprehensive direction as to how land and resource management planning is to be conducted on National Forest System lands. The law specifies that each National Forest will prepare, through an interdisciplinary team approach, an integrated, and comprehensive land management plan.

With respect to the water element, NFMA directs the Forest Service to protect, conserve, and enhance the water resources. To achieve this, each plan must comply with the requirements of the Federal Water Pollution Control Act Amendments and all "substantive and procedural requirements of Federal, State and local government bodies with respect to the provisions or public water systems and disposal of waste water".

The law provides very specific water resource management standards and

guidelines to be used during the planning process. It states that all management practices will conserve soil and water resources, and not allow significant or permanent impairment of the productivity of the land. Streams, streambanks, shorelines, lakes, wetlands and other bodies of water must be protected.

The impacts on National Forest management are substantial. The forest manager's water resource responsibilities have again increased. Not only must they comply with the provisions of the Federal Water Pollution Control Act, but must also undertake comprehensive planning to ensure forest activities will have minimal adverse impact on the water resources. The forest manager is increasingly finding himself in a position of managing the land for water quality. In the future, with the development and implementation of the Forest Plans, he will spend an increasing proportion of his time in water resource management.

CONCLUSIONS

The public is placing an ever increasing demand on the quality and quantity of water originating from National Forest land. Recent legislation requires the forest manager to carefully plan and administer forest activities so they improve or maintain the quality of the water resource. At the same time, the courts appear to be heading toward requiring quantification of Forest Service reserved water rights in order to promote efficient distribution and use of water within each state. Together, those requirements have tremendously increased the National Forest's watershed management responsibilities. To meet these increased demands, both now and in the future, the forest manager will be required to spend an increasing proportion of time and energy devoted to water resource management.

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